Response to the Program Review
College of Natural Sciences
University of Hawaii, Manoa
July 21, 2014

The external review team provided a thorough analysis of the many issues and opportunities facing the College of Natural Sciences. The College of Natural Sciences is encouraged by the highly favorable review and is energized to address the recommendations of the review team. The development and implementation of plans to address these issues will require the thoughtful input of all stakeholders and will take some time. It will be particularly challenging to implement some of these recommendations during the next two years while the university reassesses and realigns its budgeting process. Nonetheless, we are confident that the College of Natural Sciences will be able to secure critical support from the administration as needed to implement critical changes because of the central role of the College of Natural Sciences with the mission and goals of the Manoa campus of the University of Hawaii.

In the following pages the fifty-nine recommendations of the review team are addressed.

William Ditto
Dean

Steven Robinow
Interim Associate Dean

College of Natural Sciences
Recommendations and Responses

CNS 1: The College of Natural Sciences would benefit from increased attention to strategic planning (in concert with the Chancellor and the Vice Chancellor – Academic Affairs). Plans should, among other things:

- set specific goals in important areas (e.g., target research funding, graduation rate, staffing levels);
- identify areas of excellence (or target areas to develop) in which to hire;
- encourage collaboration across departments in the College and with relevant units outside CNS;
- identify and exploit features that are unique to the local environment where UH may expect to have a competitive advantage over peer institutions;
- explore ways to connect campus organized research units and the academic departments in CNS to the benefit of both;
- develop an integrated strategy to enhance student success (advising, research, internships, etc.);
- pay careful attention to faculty, staff and student diversity and to supporting a diverse student population.

Response: The Dean will bring these issues to the attention of the seven department chairs in semimonthly meetings. During year 1, the Dean will work with the Chairs to develop a vision and strategic plan to address these issues within each department and within the college as a whole. A timeline will be developed to put these plans into action.

CNS 2: The Campus should carefully consider the budget model that is used to set College budgets. The budget model should provide additional funds to units that are addressing increasing numbers of students. The budget model should also be more transparent to enable Deans to plan.

Response: The College of Natural Sciences most strongly supports this recommendation. Funds must be provided to support the increasing undergraduate enrollment in the College of Natural Sciences. The College of Natural Sciences cannot improve student retention and decrease the time to graduation in an expanding student population with a flat or declining budget. Whether progress is made on this issue by the completion of Year 1 is dependent upon the actions of the leadership of the Manoa campus. The College of Natural Sciences urges the Vice Chancellors and Chancellor to act on this recommendation immediately.

CNS 3: The College and Departments should develop programs that reward and incentivize faculty excellence. These can include allowing differential responsibilities for faculty, instituting a college-level faculty recognition program, and setting up a college-level pre-award grant support center.

> **Response**: The College of Natural Sciences is planning on hiring a pre-award specialist to support research-active faculty and to encourage faculty that are less research active to re-engage in the process. Ideally this position will be filled in year 1, but this action requires an exception to the current hiring freeze and must be approved by the administration. The Dean will discuss with the chairs of the seven departments the concept of college-level incentive-based recognition and awards for research-active faculty. Ideas will be developed in year 1 and implemented in years 2 and 3.

CNS 4: We recommend that the Dean and Vice Chancellor for Academic Affairs identify a few areas in which campus processes can be improved, set specific goals (e.g., generate faculty offer letters within x days), and then achieve those goals.

> **Response**: The College of Natural Sciences is in the process of implementing a document tracking system for all HR related documents handled by the college. As this system is tested, it will be expanded to include tracking of other documents handled by the college. The College of Natural Sciences would be very pleased to work with the office of the VCAA to improve the velocity of paperwork within the Manoa hierarchy.

CNS 5: The College of Natural Sciences should carry out a climate survey of students, faculty and staff.

> **Response**: The College of Natural Sciences would be very pleased to carry out a climate survey. The Dean of the college will work with all stakeholders to determine the scope of this survey. The college will assemble a team to select the best available tool for this purpose. The survey will be conducted in the second half of the first year and analyzed immediately thereafter. Due to current budgetary issues the college may not be able to implement the survey until year 2.

CNS 6: The campus should continue an aggressive campaign of facilities improvement. Snyder Hall and Keller Hall are the highest priorities within CNS.

> **Response**: The College of Natural Sciences strongly supports efforts to improve campus facilities. The college supports every effort to provide modern and innovative facilities that support learning and research.

CNS 7: The Dean and Department Chairs should increase their efforts to educate faculty about the need for assessment and the ways assessment can be used to enhance programs.

> **Response**: The College of Natural Sciences recognizes the many purposes of assessments. The Dean will ask department chairs with more advanced assessment programs to present their assessment programs at the semimonthly meetings of the department chairs. This will provide a forum to discuss the benefits of a well structured assessment program as well as the obstacles to developing and implementing assessment. It should then be possible to develop a timeline for the development or improvement of assessment programs in those departments in which assessment is minimally implemented. The Dean will make every effort to provide the support needed to develop and implement these plans.

CNS 8: Departments need to pay careful attention to the financial offers made to graduate students. Offer letters should be clear and transparent to the students. Stipends should be increased as funds allow and longer guarantees made where possible. In addition, an effort should be made to provide summer opportunities (support, internships, etc.) for students.

> **Response**: The College of Natural Sciences is all too aware of these issues. The college has already developed a standard letter of offer for graduate students. Everyone is very concerned about increasing stipends. The college recognizes that to be competitive with stipend levels at competing graduate programs on the mainland, stipends must increase more than 50%, raising stipends from approximately ~$18,000 annually to between $25,000 and $30,000 annually. The college supports approximately 250 teaching assistantships annually. Thus, the college must identify $250,000 per year to support each $1,000 increase in stipend. The college also recognizes the need to guarantee support throughout the career of a graduate student and understands that generating these funds will require a commitment from the university as well as efforts by faculty to secure training grants and efforts by the Dean to secure endowed fellowships and scholarships.

CNS 9: It is critical that graduate curricula be reviewed regularly to ensure that course offerings are sufficient to meet program requirements. To the extent this is not possible then departments should ensure that students are recruited only into programs/areas where students can expect to make regular progress.

> **Response**: The College of Natural Sciences would bundle this recommendation with recommendation CNS 7 concerning the need for and value of assessment. The Dean of the College of Natural Sciences will

meet with the graduate division to get their perspective on the programs within the college in which students appear to have difficulty making regular progress. The Dean with then bring these issues to the appropriate department chairs. The department chairs will be given the opportunity to respond. If the Dean feels that the response is inadequate, the Dean will require that the department develop and implement a plan to address the problem.

CNS 10: The College should move as quickly as possible to develop a standalone CNS undergraduate advising system. A single point of contact model in which students can get information on a range of topics (curriculum planning, financial aid, etc.) would be ideal. The advising structure should ideally achieve an integrated model for student success that addresses internships, research experiences and jobs as well.

Response: The College is rapidly moving toward this model. On August 18 2014, the department with the largest student enrollment in the college, the Department of Biology will be taking over all undergraduate advising for all life science majors within the College of Natural Sciences (botany, ethnobotany, microbiology, molecular cell biology, biology, and marine biology). The scope will be limited to all undergraduate degree requirements and curriculum planning. Issues of financial aid are currently beyond the scope of this integration. The college is working to centralize all of the advising. Space has been identified in Keller Hall that will be used to open a comprehensive student advising center. The space will be available to occupy by August 20th. Advising services will be available in this space shortly thereafter.

Department of Biology
Recommendations and Responses

BIOL 1: The department is commended on the collegial and friendly atmosphere for faculty. The failure of any students, undergraduate or graduate, to attend the meetings scheduled with the review team suggests that students may not be actively engaged by faculty members beyond instruction. It is recommended that the department develop specific activities to address this issue. These could include faculty-student lunches, freshmen seminars, faculty- advised clubs and social events.

Response: Through the Biology Advising Group, led by Dr. Stephanie Kraft-Terry, social events involving undergraduates and faculty are being held on a semesterly basis, typically involving a weekend half day hiking or on the beach. The Biology Chair will inform faculty of these events and facilitate increased participation. In Year 2, Meet-the-Faculty lunches are planned for each of freshmen, sophomores, juniors and seniors to allow students to see faculty outside the classroom in a social setting.

Graduate student socials are held weekly following the Friday afternoon departmental seminar. Unfortunately, faculty turnout tends to be low, particularly among younger faculty having children. Given the small size of homes of most faculty due to the high cost of housing in Hawai'i, and the geographically dispersed nature of student and faculty housing, social events tend to take place on campus. The Chair plans to meet with graduate students to find out their concerns and suggestions regarding ways to increase faculty-student social interactions. A similar conversation will be had with faculty, in an effort to increase graduate student interactions with faculty as social peers.

BIOL 2: The department has had an infusion of several outstanding new hires that appear to be focused on ecological and evolutionary biology. Four additional hires are expected. Thus the department is well positioned to start thinking about multi-PI funding opportunities. A strategic plan should be developed that focuses on unique opportunities and strength in evolutionary biology, ecology and marine biology. Collaboration in these areas with the other life sciences departments in CNS should be a high priority. Steps should be taken at both the departmental and college level to facilitate grant submissions by the faculty.

Response: The University of Hawai'i at Mānoa has just entered a hiring freeze of unknown duration. While this is likely to temporarily freeze new hires in the Department of Biology, the Chair will ask faculty in Year 1 to review the existing Strategic Plan to explore the idea of developing centers of excellence in areas the faculty feels the department is uniquely situated to pursue, and to develop a five year hiring plan that addresses both current needs and future-building. It is hoped that the plan can be activated once the freeze is lifted.

BIOL 3: While no graduate students met with Dean Hildreth, it is clear that issues raised by students in other programs very likely apply to graduate students in the Biology Department as well. These should be addressed at both the college and departmental level and include low stipend levels, low number of graduate research assistantships, unavailability of courses required for passing qualifying exams and absence of a defined curriculum.

> **Response**: This year, for the first time, graduate students of Biology instructional faculty receiving TAs were provided a small bonus of $650 for each semester that they served as a teaching assistant. This money was provided by summer tuition income. This plan is expected to continue and to increase to the extent supportable by summer revenues. The current hiring and wage freeze currently blocks using summer revenue for this purpose but it is assumed that the program can resume once the freeze is lifted. The Chair will also work with the Dean of Natural Sciences to increase TA stipends to more competitive levels.
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> RAships are currently directly tied to grant funding. The Department is not currently in a position to provide RA support. The Chair will discuss with the Dean the possibility to initiate fund raising efforts to provide departmental RAships to a small number of graduate students.
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> The Chair will ask the Associate Chair of Graduate Education and the Graduate Chair to develop a curriculum plan for faculty consideration.

BIOL 4: The department is commended for its meaningful and significant responses to the concerns raised in the previous review. The committee recommends that the department continue its effort to revise and simplify the curriculum with the purpose of facilitating improvements in four year graduation rates and preparing student for diverse aspirations.

> **Response**: The Vice Chancellor of Academic Affairs has just agreed to a proposed reduction in credit requirements for the BS in Marine Biology which, in addition to fewer required courses, is hoped to improve retention and time to graduation in this popular undergraduate program. Through the Biology Advising Group, led by Dr. Stephanie Kraft-Terry, a number of workshops were initiated in 2013-14 covering topics such as preparing for graduate school, preparing for medical school, writing a resume, writing a job application, and in career development. Due to the success of these workshops, more are planned for 2014-15 with plans to make this a permanent part of student-oriented Department of Biology resources.

BIOL 5: The failure of undergraduate students to attend the meeting scheduled with Dean Hildreth appears to reflect a lack of engagement between faculty and students in

the department. The department should consider ways to correct this such as faculty-student luncheons, faculty-advised clubs, social events and freshmen seminars.

> **Response**: Through the Biology Advising Group, led by Dr. Stephanie Kraft-Terry, social events involving undergraduates and faculty are being held on a semesterly basis, typically involving a weekend half day hiking or on the beach. The Biology Chair will inform faculty of these events and facilitate increased participation. In Year 2, Meet-the-Faculty lunches are planned for each of freshmen, sophomores, juniors and seniors to allow students to see faculty outside the classroom in a social setting.

BIOL 6: The department should actively seek opportunities for research collaborations with other departments in CNS and with faculty members in other units in the university. Such collaborations could emphasize projects related to grand challenges including the environment, health and food. In addition to facilitating multi-investigator grants, such collaborations would contribute to a greatly improved training environment for students and help to attract top graduate students and outstanding faculty.

> **Response**: The Chair will ask faculty in Year 1 to review the existing Strategic Plan to explore the idea of developing centers of excellence in areas the faculty feels the department is uniquely situated to pursue and to evaluate the possibility of inter-departmental sharing of hiring goals to promote inter-departmental research collaborations and research opportunities.

BIOL 7: The department should develop a plan for recruiting and retaining a diverse faculty. Possible specific approaches include implicit bias training for the search committee members as well as ensuring broad and diverse committee membership. Every effort should be made to identify diverse applicant pools and to avoid narrowly focused searches when possible.

> **Response**: The Chair will require all members of future search committees to undergo bias training in addition to HR training to ensure that search committee members are fully aware of diversity issues.

Department of Botany
Recommendations and Responses

BOT 1: The Department of Botany is commended for its collegiality and the cohesiveness of its faculty members. The department chair is encouraged to hold regular faculty meetings to communicate with the faculty members regarding important departmental and college issues and to insure that college level decisions and issues are communicated effectively to Botany faculty members.

Response: The department already holds regular, usually weekly, faculty meetings during the academic year where the focus is usually on departmental issues. The Chair will try to do a better job of communicating college issues to the department.

BOT 2: The faculty members are encouraged to reach out to faculty members of other departments in CNS to engage in more collaborative teaching and research activities.

Response: The chair will encourage departmental faculty to follow this recommendation.

BOT 3: The faculty in the Botany department should be encouraged to submit proposals for funding to federal agencies, especially the NSF. The department and college should take steps to improve pre- and post-award grant support for faculty.

Response: The Chair regularly encourages departmental faculty to seek new extramural funding and provides them with information on new opportunities. He will continue to do so.

BOT 4: The challenges related to graduate education in the Botany department are similar to those in other CNS departments and thus warrant attention at the college level (low stipends, low numbers of teaching assistantships). The department should take steps to create a defined curriculum and ensure that appropriate courses relevant to qualifying exams are available to students. The department should work with other units in CNS to create professional development opportunities for graduate students including travel awards for research meetings and conferences.

Response: In Fall 2014, the department will be offering a new graduate seminar that will provide new graduate students with a broad exposure to the field of plant biology. Over the next several years we will discuss new ways to create professional development opportunities.

BOT 5: The department is commended on its efforts to map the curriculum of the majors and to develop tools to measure effectiveness. The changes made in course

offerings and sequencing to enhance 4-yr graduation rates are also applauded. The committee recommends that the department continue its efforts to innovate the curriculum, especially focusing on incorporating the research of the faculty into the student experience. The department should work to increase the exposure of undergraduates to research and take steps to increase opportunities for internships.

> **Response:** The department will continue its efforts to innovate the curriculum although, having made recent changes, we do not foresee making substantial changes over the next few years. We will explore ways to increase the exposure of undergraduates to research and to increase opportunities for internships.

BOT 6: The lack of participation of students in the pre-arranged meetings with the review team suggests that the faculty may not be engaged with the students. The department should consider ways to correct this such as faculty-student luncheons, faculty-advised clubs, social events and freshmen seminars.

> **Response:** As part of our recent revisions to our undergraduate curricula, we have instituted seminars for our majors. We expect that these will help increase student participation and interest in departmental affairs.

BOT 7: The Botany department should actively seek opportunities for research collaborations with other departments in CNS, especially the other life sciences departments. As noted above, a specific goal should be obtaining multi-investigator awards that take advantage of the strengths of the newly recruited and existing faculty, especially in the areas of evolutionary and conservation biology. Inter-departmental and inter-college collaborations would bolster the stature of the programs in CNS help to attract top graduate students and fellows and outstanding faculty.

> **Response:** Departmental faculty will be encouraged to reach out to other departments to develop collaborations.

BOT 8: The department is commended on its diversity and is encouraged to maintain and expand its diversity as it grows through future hires. To that end the committee encourages the department to develop a plan for recruiting and retaining a diverse faculty. Possible specific approaches include implicit bias training for the search committee members as well as ensuring broad and diverse committee membership. Every effort should be made to identify diverse applicant pools and to avoid narrowly focused searches when possible.

> **Response:** As noted in the review, “The diversity of the Botany department appears to be good both with respect to gender and ethnic and racial minorities”. Thus, we will continue our current practices in this regard.

Department of Chemistry
Recommendations and Responses

CHEM 1: Assess the departmental climate as it impacts faculty, staff, and students in the Department of Chemistry. (Note that this can be done as part of the college-level climate survey recommended in the college review.) Dean Roberts learned that some departmental stakeholders perceive a chilly and hostile climate. The review team could not confirm that this is the case, but it was concerned enough to believe that a careful assessment would be valuable. If serious climate issues are uncovered, the Vice Chancellor should consider hiring an outside facilitator to address the most important issues.

> **Response:** The low student turnout for the graduate students' meeting with Dean Roberts has provided a lopsided, negative, and unfairly biased view of the Chemistry Department. The Chemistry graduate program has 30-40 students, at any given time. Only 2 students showed up to the meeting with Dean Roberts, with a third providing written comments, *less than 10% of our graduate student enrollment*. Likely, these 2-3 students represented only the issues in 1-2 research groups. If all students (or at least more of them) had attended the meeting, then feedback would have been more complete, significantly more representative and likely more positive. This assertion is based on regular, now-annual graduate student lunch meetings with the Department Chair and Associate Chairs. Of note, these meetings have always attracted *75% or more of the Chemistry graduate students, encompassing a broad cross-section of students.* The "lack of community" in one or two labs is certainly not a reflection of the entire department, but possibly a reflection of the supervisor(s) of the 2-3 students who met with Dean Roberts. *The Chemistry Department will maintain a healthy and productive climate through communication, collaboration and cooperation, largely through regular meetings with graduate students, faculty, and staff.*

CHEM 2: Even at full build-out, the department will still be relatively small, making it extremely important to encourage the growth of scholarly communities that extend beyond the sub-disciplines. The department might evaluate the usefulness of the current, highly focused hiring strategy.

> **Response:** In the past, faculty hiring has been conducted for each subdiscipline (inorganic, biochemistry, etc.), with limited success, as noted by the panel. However, opening the search to all areas has also met with very little success, as it tends to pit the individual interests of the faculty and the upper administration against one another. Nevertheless, it is agreed that a change in strategy is needed. *Thus, in Fall 2014, the Chemistry Department will launch a search to fill multiple positions in materials chemistry, i.e., looking at the chemistry of materials with expertise borrowed from and across the various subdisciplines, i.e., "extension beyond the sub-disciplines".*

CHEM 3: The department should also reconsider current policies and practices regarding the graduate program. In addition to the college-wide issue of inadequate financial support, two areas are of particular concern. First, even senior graduate students appear to be generally supported as teaching assistants during the academic year; the department should consider whether faculty with grant funding should be encouraged and perhaps incentivized to provide academic year research assistantships. Second, the department should acknowledge its responsibility to ensure that every admitted graduate student has access to an appropriate set of courses. If students in a certain sub-discipline won't have access to necessary courses, especially including those that provide essential preparation for the qualifying examinations, then the department should either modify its requirements or suspend admissions into the program until requirements can be met.

> **Response:** Regarding the first concern, the suggestion to move more of our senior graduate students to RA support is duly noted. However, we note that it is very difficult to balance this goal with the need to staff our lab sections with qualified TAs. The total number of applications to Chemistry's program is steadily decreasing, reflecting a national trend. As a possible counterpoint, the *Chemistry Department will continue to hire new faculty that will, in turn, provide more opportunities at Hawaii for students*, both in terms of RA support with new grants and more choices (of graduate research projects) overall. Regarding the second concern, the *Chemistry Department assures that there will be appropriate graduate course offerings, as long as the successful recruitment of tenure-line faculty continues.* For instance, in Fall 2014, five graduate-level lecture courses will be taught by Chemistry faculty, one by the newest hire.

CHEM 4: The department should work with appropriate units on campus to develop strategies for increasing student success in the gateway courses. Such strategies need not result in "dumbing down" of the curriculum. Moreover, as the university prepares to revisit its budget model, and to move away from an incremental model for resource allocation, the department should be even more aggressive about recruiting undergraduate majors.

> **Response:** Past collaborations with Biology and other NatSci offices focus on student success initiatives from administrative ones (e.g., scheduling of core courses to accommodate student needs) to those providing direct assistance to students in Chemistry courses (i.e., Learning Emporium). *Chemistry's involvement with the Learning Emporium and cooperation with the other Natural Sciences departments are ongoing*, *thus reaching the large number of students who are enrolled in the gateway courses. Regarding recruitment, publicity for the chemistry and (new) biochemistry degrees has been increasing steadily, and the launch of the new Chemistry website in late 2014 should greatly improve the department's visibility and, as a consequence, attract more majors.*

CHEM 5: The failure of any undergraduate to come to the meeting that was set aside for that purpose was taken by Dean Roberts as a sign that students are not engaged in the life of the department. The department should consider simple strategies (faculty-advised clubs, social events, journal groups, etc.) that might bring undergraduates and faculty together for informal interactions.

Response: As noted earlier, the students were not informed of the opportunity to meet with Dean Roberts, and the Chemistry Department was not involved in recruiting or inviting students to this meeting. The Department believes that the turnout would have been significantly higher, if more direct interaction with the students were allowed.

Chemistry will continue certain student-centered activities, as in years past. For instance, Chemistry faculty members advise the undergraduate "Chem Club", with membership from all disciplines. Chemistry faculty routinely participate in College-wide social events with students, as well. *Further improvements will be sought with inclusion of undergraduate majors in other department-wide activities, including the 2014 Departmental Poster Session (held annually).*

CHEM 6: Rethink the current departmentally-focused hiring plan, and consider whether an emphasis on broad "grand challenge" areas involving multiple departments and colleges might be a better route to success than standard disciplinary hiring. There are unrealized opportunities for collaboration within and outside the department. The ability to compete for large multi-investigator grants, to recruit top graduate students, and to grow the department's stature will require the development of a more collaborative and entrepreneurial faculty culture.

Response: The response to "CHEM 2" addresses a similar point. *Chemistry's faculty recruitment strategy will adopt a revised approach, with these recommendations in mind.* The proposed Fall 2014 cluster hire (2-3 positions) in materials chemistry will provide numerous opportunities for collaboration in Hawaii (UHM Chemistry and other departments) and with other scientists at major national and international hubs, with the goals noted in mind. Future cluster hires in Year 2 or 3 will take a similar approach, incorporating multiple hires across the traditional sub-disciplines to identify scholars who have a common focus area.

CHEM 7: Develop a comprehensive strategy for recruiting and retaining a more diverse faculty in the Department of Chemistry. Possible approaches might include additional search committee training and broader search committee membership, avoiding whenever possible narrowly focused searches, and more vigorous efforts to identify potential applicant pools.

Response: *Most of the suggested elements of the "comprehensive strategy" are in-place or will be adopted.* Search training is now required for all faculty and staff who participate in the screening and/or interviews. The suggestion to "broaden" the search committee membership is an excellent one. Search committee membership will be expanded to include others (not just Chemistry faculty). Possible membership may include faculty from outside the Chemistry Department, Chemistry students, and/or Chemistry staff. Diversification with respect to scientific background, age, gender, and ethnicity/race will be considered in the composition of the committee. As noted above, the upcoming search will break with our past practices as we initiate a "cluster hire" in materials chemistry. Finally, Chemistry is considering "more vigorous efforts" for the recruitment, but it is a challenge. In the past, ads were posted online at C&E News, UHM Chemistry web page, & Work@UH. The Nature website was used in a past search, greatly increasing the total number of applications, but the vast majority of applicants were weak or unqualified.

Department of Information and Computer Sciences
Recommendations and Responses

ICS 1: Transforming to a School of Information and Computer Science within CNS is a potentially beneficial step for the department, college and university, and should be considered. This should be done, however, in the context of constructing a vision for the unit which articulates how a transformation to a school could provide new opportunities for excellence in education and research. For example, the school structure could enhance the opportunity to construct a new major (or a version of the existing BA) in informatics or a related name, to construct new multidisciplinary research and education programs in data science or other areas, and to interact more extensively with other units at UH Manoa. A proposal to become a school should be predicated on identifying such opportunities, while also acknowledging the structural and visibility advantages that a school could provide.

> **Response:** The ICS Department has formed a committee led by Scott Robertson to articulate our vision for the new School and draft a reorganization proposal. We expect an initial draft within the next year for review and revision by the College, after which review and approval by the University and Board of Regents may take another year.

ICS 2: The department should consider designating 2-3 areas where it aims to have particular strength in research and graduate education, based around a cluster of research-active faculty in each area. As needed, it should target future hires to build these clusters. The recent hires in security and visualization make these areas attractive candidates for excellence, and there is some current concentration of faculty in human-computer interaction / artificial intelligence. The department will want to project its national / international leadership in selected research areas on its website and other materials. The opportunity for LIS to develop a specialization in native Hawaiian areas may be attractive as well.

> **Response:** The Department has selected cyber security as our first area of emphasis. ICS already has two faculty in this area, Professor Dusko Pavlovic and Assistant Professor Depeng Li. The Department Hiring Committee has proposed hiring a faculty member with expertise in encryption related to cyber security to complement our two existing cyber security faculty. Due to a resignation, we have an opening in computer science, so we hope to advertise for this faculty member this Fall to begin Fall 2015. The LIS Program is currently working with the School of Hawaiian Knowledge on a dual Masters degree agreement. Hawaiian and indigenous collections is one of the areas of expertise that the LIS Program Hiring Committee is looking for in the LIS faculty opening created by the retirement of a current LIS faculty member. We hope to advertise for this position this Fall to begin Fall 2015.

ICS 3: The department should increase its emphasis upon faculty attracting external funding that supports research assistants. It should consider providing incentives for faculty who are successful in this regard, such as reducing teaching loads for faculty who support a number of research assistants on external grant funding. The possibility of a reduced teaching load will be necessary to compete successfully in hiring excellent research-oriented faculty. To compensate for the loss of teaching, the department may want to consider a small increase in the use of lecturers for undergraduate education.

> **Response:** The issue of incentives for research productivity such as grants is currently under discussion.

ICS 4: The department needs to find a way to provide more support to students in finding internships, understanding computing careers, and finding jobs after graduation. It may want to explore ways to do this in partnership with other units, such as within CNS, or by partnering with Engineering.

> **Response:** We agree that more could be done. We believe that one way to increase support would be college-level initiatives to support STEM careers in general. ICS already partners with Engineering on its Career Days.

ICS 5: The department also should examine the software project portion of its curriculum, including looking at practices in other leading CS departments. A capstone course is a common way to address this aspect of the computer science curriculum. Enhancing this area of the curriculum may require the use of lecturer or adjunct faculty who are well experienced in software projects and can devote the time that software project course require. The department also should assure that course schedules are available at least a full year in advance so that students can plan effectively.

> **Response:** We believe that the undergraduate students interviewed by the review committee were not aware of the many opportunities currently available for software projects, including the project-based curriculum in ICS 314 which is actually a required class for both the BA and BS degrees.

ICS 6: The department should construct and implement a diversity strategy.
There is considerable national experience to draw upon in doing so. Elements of a successful strategy generally include: advising at the department, school and university level that makes students aware of the breadth of computing education and careers; introductory courses that provide a supportive environment including teamwork and give encouragement to promising students to pursue the major; student support organizations such as Women in Computing that provide community to students who desire it; faculty and staff support for students throughout their time in the program including regarding internships and careers.

Response: The ICS Department has had for many years an introductory course, ICS 110, that was specifically designed to attract women students. It has been taught regularly by Associate Professor Guylaine Poisson and has attracted a large percentage of women students. Also ICS recently started sponsoring the NCWIT (National Center for Women in Information Technology) Aspirations in Computing Award, which encourages young women to pursue careers in IT. We are working with Engineering to extend their SWE (Society of Women Engineers) chapter to ICS students and will investigate forming a Women in Computing chapter.

ICS 7: ICS should consider creative ways to provide some community space for CS students. It may be possible to carve out some community space in POST. Another possibility could be to allow CS students (possibly just graduate students) to use the generous student community space that is provided for LIS students in Hamilton Library.

Response: Unfortunately this is part of a larger problem: the computer science part of ICS has outgrown its space on the 3rd floor of POST. Lab space for two of our recent faculty hires have had to be carved out of space in Keller Hall. We do have a room for ICS graduate students, POST 316, but it is a relatively unattractive space with no windows. There is no space at all for our almost 400 undergraduate majors.

ICS 8: As the department constructs its vision and strategies for many of the topics mentioned above – such as featured areas for research and graduate education, increased research funding, provision of enhanced career and internship advising, attention to gender diversity – collaboration with other units at UH Manoa can play an important role. The department should think about how interaction with units including engineering and others can help it more successfully and effectively achieve its goals. It also should assure that it takes full advantage of the fact that CS and LIS are part of one department, and utilize this fully in both education and research.

Response: We agree. Indeed, over the past several years we have developed a joint undergraduate degree with electrical engineering (computer engineering) which has led to increased cooperation with respect to curriculum.

We believe that our faculty collaborate a great deal with other units, though these collaborations are not adequately communicated to the public. Over the next 12 months, we will make available on our website a description of our collaborations with other units that will increase its visibility, and hopefully lead to new collaborations.

Department of Mathematics
Recommendations and Responses

We thank the review team for their work, their thorough analysis of the issues facing the Department of Mathematics and their frank assessment and recommendations.

Faculty (recommendations 1-5). The review team recognizes that the age distribution of our faculty and our workload—which has increased significantly recently and exceeds that of our peer departments—pose serious challenges for the department going forward. When the Self Study was written we were recruiting four positions, of which we filled two. Since then we have lost an additional five faculty (four retirements at the beginning of June and one resignation). Thus, seven of our twenty nine faculty lines are currently unfilled. We expect three or four additional retirements during the coming academic year.

MATH 1: The Department of Mathematics should receive permission to recruit aggressively in view of the anticipated retirements. One strategy is to allow them to make more offers than there are vacancies during a recruiting cycle. Given that not all offers are successful this will increase the probability of a successful recruiting season. In the unlikely event that too many offers are accepted this will merely decrease the number of recruitments in the subsequent year.

> **Response:** We intend to fill all vacant lines that arise in the department during the period covered by this review, including the five recently vacated faculty lines, the two remaining lines from last year's search, and any lines which become vacant in the future. And, as recommended, we will work with the CNS and UHM administration to produce a strategy to accomplish this successfully.
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> We suggest a strategy incorporating the following elements: (1) it is important that we advertise in early fall as is typical for mathematics departments; (2) in each recruiting cycle we should advertise all vacant lines so that we are able to make a large number of offers; (3) in the event we do not fill all advertised vacancies in a given year, we should backfill (at least some of) the unfilled positions with Temporary Assistant Professors on multi-year contracts to 'smooth out' upcoming vacancies.

MATH 2: The Department should think strategically about how to approach the large number of current and expected recruitments. Ideally the plan should identify areas in which the Department might like to establish or enhance its reputation. The plan should also integrate collaborations with other departments in the college and relevant units outside CNS.

> **Response:** Several years ago the department approved a strategic plan. The hiring rubrics adopted as part of that plan included recruiting individuals able to establish collaborations across the college and university. We

routinely emphasize this in our hiring, especially when hiring in areas of applied mathematics. And we have been successful in recent years attracting individuals capable of establishing such collaborations.

Another hiring priority in the strategic plan is to build excellence in a small number of areas, each sufficiently populated to support graduate students, etc. With the current large number of vacancies we are challenged to maintain faculty representation in core areas of mathematics and, while we have made some progress in identifying target areas, further discussion is needed in the department. We expect to be able to bring this into much sharper focus in the near future as we begin replacing retiring faculty.

MATH 3: The Department should develop an approach that incorporates differential workload to reward and incentivize faculty achievements in research. The appropriate teaching workload for research active faculty in peer (and aspirational peer) departments is 3 semester courses per year. Currently the workload for all faculty members is 4 semester courses per year.

Response: We certainly agree that our teaching load is competitive neither with our peer departments, nor with departments against which we compete in recruiting. During the visit of the review team, we discussed several possible strategies to address this: (1) increase class size in first year calculus, moving to a large lecture format together with a possible increase in recitation hours; (2) teaching specialist faculty, as mentioned in the review team's report (see Recommendation 4, below).

In discussion within the department over the last year or so, the sentiment has emerged that the first model is our preferred option, and we have begun to formulate a detailed plan to reduce the teaching load of research active faculty from four to three courses per year. We intend to refine our plan within the next year, informed by the review team's report and discussions with the CNS leadership.

MATH 4: The Department will be challenged to meet its teaching obligation and to insure high quality instruction while dealing with faculty vacancies and reducing the teaching load of research active faculty. This can be addressed if the Department explores the use of teaching specialist faculty (these have a variety of titles in other institutions). Such faculty can contribute a great deal to meeting increasing student demand for courses and to enhancing the quality of instruction.

Response: We will explore the use of 'teaching specialist faculty' to increase teaching effectiveness while decreasing workload for faculty with active research pro- grams in mathematics. There are a number of models to consider and, while some of the simpler models are not our priority (see

above), we expect our discussion to be informed by the experiences and ongoing discussions in other departments in CNS.

MATH 5: The review team applauds the Dean's commitment to initiate a post-doc program in the Department. Such individuals can enhance the research reputation of the Department. We recommend that the build out to three post-docs continue.

Response: We agree and support the build-out of our recently established post-doc program to its originally envisioned full strength of three faculty.

MATH 6: Develop a strategy for recruiting and retaining a diverse faculty. Possible approaches include search committee training (e.g., about implicit biases), broader search committee membership, avoiding narrowly focused searches, and making an effort to identify the broadest possible applicant pool.

Response: The review team notes that the department has only three female faculty members, although they point out that all of these have been hired since 2002. They recommend we work to increase diversity among our faculty, and include several concrete suggestions.

Our department and members of the search committee last received general train- ing from representatives of the campus EEO office in fall 2010. During the coming academic year we will contact the EEO office to request further training, including implicit bias training.

In general we have a large applicant pool for our advertised positions (typically 5-600 applicants). While we do select 'focus' areas for hiring which reflect departmental needs and priorities, our searches are alway open to candidates in all areas of mathematics.

MATH 7: The Department of Mathematics needs to quickly fill the staff opening in the Department. Any support that can be provided by CNS administration to enable rapid completion of this recruitment would be welcome.

Response: The review team recommends that the department quickly fill the staff opening created by the resignation of one of our administrative staff members last year. We agree, and intend to fill this opening during the coming academic year.

MATH 8: Renovation of Keller Hall should be a high priority for the College of Natural Sciences and the campus.

Response: We agree with the recommendation of the review team that the renovation of Keller Hall should proceed with alacrity. We have previously submitted ideas for this renovation, and will continue to work with the administration to make this renovation a reality.

Department of Microbiology
Recommendations and Responses

MICR 1: The climate in Microbiology appears to be impacting the graduate students to a considerable degree. A formal assessment of the climate is warranted (this could be done as part of the college-level climate survey recommended above) and depending on the outcome, consideration should be given to hiring a facilitator to address important issues. It is also recommended that the department chair hold regular faculty meetings to allow members to express their concerns and ideas and also be kept abreast on issues germane to the department.

Response: A formal assessment concerning the well being of graduate students is planned for August 2014. Starting fall 2014 the graduate chair will meet one-to-one with graduate students every semester to understand and improve the overall culture of faculty and student relationship.

Departmental faculty meetings will continue to be held on a regular basis every semester. Email will be used as necessary to share issues of an urgent concern.

MICR 2: The department should be very strategic in hiring new faculty in well- defined focus areas that build on existing strengths in the department and other units within CNS. Collaborative research programs with Botany and Biology should be considered that leverage resources and create added value for faculty and students.

Response: The department has a clear vision about the strategic growth in Pathogen Cluster and Environmental Microbiology. The department has implemented the plan to hire new faculty for core areas: Immunology, Virology, Infectious diseases and Environmental Microbiology with emphasis in Genomics and Bioinformatics for the 2014-2016 academic years.

MICR 3: The department should develop a plan to revise policies regarding graduate students and their training. As mentioned above, the college-wide issue of low support for graduate students must be addressed. At the level of the department, increased extramural support of faculty will allow more students to be supported by research assistantships. The department should work to ensure that graduate students have access to an adequate number of courses to prepare them for their qualifying examinations. The department should develop a specific plan to ensure the appropriate environment (collegial, collaborative, nurturing) for enrolled graduate students.

Response: The new Graduate Chair plans to address this issue by having a thorough revision of the Microbiology Graduate Program via a Curriculum committee involving all faculty during Fall 2014. A new initiative will be launched to increase graduate level courses by the Cooperative graduate

faculty starting Spring 2015, so that graduate students will have a larger diversity of Microbiology courses.

The department Chair and Associate Chairs will work in collaboration with the faculty and the graduate students to develop plans to foster a more collegial, collaborative, and nurturing environment for graduate students. The department is already planning on implementing a series of events including a mini-series seminar by graduate students, one social event involving both graduate and undergraduate students per semester, and thorough discussion about one month cross-laboratory rotations.

MICR 4: The department should work to increase the exposure of undergraduates to research and take steps to increase opportunities for internships. The failure of undergraduate students to attend the pre-arranged meeting with Dean Hildreth is assumed to reflect a disengagement of undergraduates in the life of the department and college. The department should consider ways to correct this such as faculty-student luncheons, faculty- advised clubs, social events and freshmen seminars.

Response: To increase undergraduate research, the department has planned a dedicated lab where undergraduate students can perform research under faculty guidance. Implementation of this space is scheduled for academic year 2015-2016 academic year.

MICR 5: It is recommended that the department consider developing research programs with the other life sciences departments in CNS. There are obvious areas that could be pursued including environmental microbiology and synthetic biology among others. Inter-unit collaborations could lead to multi-investigator grants in the grand challenge areas (food, health, environment) and also contribute to an exciting training environment for students. Such interactions would also provide for leveraging limited resources especially with respect to instrumentation.

Response: The Department will continue its collaborative research and teaching program with the Departments of Biology, Chemistry, and the Astrobiology program. The newly launched MICR499 experimental laboratory course “Microbial Genomes from sampling to sequencing and bioinformatic analysis” was attended by diverse student and faculty across the life sciences departments. The NASA Astrobiology undergraduate/ graduate program will include joint courses offered by Microbiology and Astronomy faculty starting Spring 2015. Marine microbiology and Coral microbiology, as part of environmental microbiology, is a collaborative research program between the Biology, Oceanography, and Microbiology departments. Both faculty and graduate students are participating in this collaborative research program.

MICR 6: The department should develop a comprehensive plan to recruit and retain a diverse faculty. Specific steps should include implicit bias training for search committee members as well as making the search committee itself as diverse as possible including women. Additional steps should include making every effort possible to ensure a diverse applicant pool.

Response: The department has a concrete plan to increase faculty diversity. Two female applicants were the top candidates for the Immunology and Virology position during spring semester, 2014. Unfortunately due to the inadequate infrastructure of Snyder Hall we were not completive enough to hire these two female applicants. The department will continue to recruit a diverse faculty in 2015-17 academic years.

Department of Physics and Astronomy
Recommendations and Responses

PHYS 1: Assess the departmental climate as it impacts faculty, staff, and students in the Department of Physics and Astronomy. (This can be done as part of a college-wide assessment as recommended above.) Dean Roberts learned that some departmental stakeholders perceive a chilly and hostile climate. The review team could not confirm that this is the case, but it was concerned enough to believe that a careful assessment would be valuable. If serious climate issues are uncovered, the Vice Chancellor should consider hiring an outside facilitator to address the most important issues.

> **Response**: The review team met with 8 out of 41 graduate students during its visit. The Report states, "More than one graduate student reported a hostile culture, and expressed the opinion that weaker students are abusively or dismissively treated by some faculty members. Some students expressed concerns about an unwelcome environment for female graduate students." The Department Chair disseminated the Report to the faculty, graduate students, and staff and promptly scheduled a meeting with the graduate students to investigate further issues reported by the review team. Twenty-two graduate students met with the Department Chair; the meeting lasts for more than an hour. The conclusion was that both issues, "weaker students are abusively or dismissively treated by some faculty members" and "unwelcome environment for female graduate students", were referring to a single case between a female RA and her thesis advisor. That case was brought to the Department Chair and was resolved. Nevertheless, the Department is taking a proactive role; the Graduate Program Advisory Committee is charged to find ways that would encourage students to communicate their concerns.

PHYS 2: The department should carefully examine its current policies and practices regarding the graduate program. In addition to the college-wide issue of inadequate financial support, two areas are of particular concern. First, graduate students reported a lack of transparency and some unfairness in offer letters written to prospective students, and in the treatment of current graduate students. Second, the department needs to develop a way to address the extreme resentment felt by some graduate students regarding the graduate students support levels offered by IfA. Unless the department is able to meaningfully deal with this issue, perhaps in collaboration with the dean and vice chancellor, it is easy to imagine that student resentment will continue to fester, and that morale problems will increase.

> **Response**: The Department Chair and the Dean are very well aware of the low TA stipend issue. For the past two years, the Department Chair has tried to supplement the low TA stipend by offering incoming graduate students either a "summer research fellowship" (funded by the Department's summer session income) or a guaranteed employment as a lab TA for a specified number of summer lab sections. Note: All incoming graduate

students are offered the standard 9-month TA stipend set by the College so there is absolute fairness. The type of supplemental offers is determined by the qualifications of the incoming students (ranked by the Graduate Program Advisory Committee) and is clearly described in the offer letters. It may seem unfair to some current students because they did not receive a "summer research fellowship". After the meeting with the graduate students, the Department Chair has decided to offer the "summer research fellowship" to current TA also. The disparity in TA support for students in IfA and in Physics and Astronomy would require intervention outside the Department. The Department will continue to seek revenues to supplement the standard TA stipend.

PHYS 3: The department should develop and implement simple strategies (faculty-advised clubs, social events, journal groups, etc.) that might bring undergraduates and faculty together for informal interactions.

Response: The current Department Chair, Pui Lam, has served as the faculty advisor for the Physics Club (Society of Physics Students) for the past 20 years. The Club has won "Outstanding Chapter" award two consecutive years and received funding from the National SPS office for outreach activities. The club has organized a weekly "Lunch with an Expert" and occasional picnics in the past where faculty and students can interact socially. The Department will encourage the SPS to re-activate these activities and will provide financial support if appropriate.

PHYS 4: Rethink the current departmentally-focused hiring plan, and consider whether an emphasis on broad "grand challenge" areas involving multiple departments and colleges might be a better route to success than standard disciplinary hiring. There are unrealized opportunities for collaboration within and outside the department. The ability to compete for large multi-investigator grants, to recruit top graduate students, and to grow the department's stature will require the development of a more collaborative and entrepreneurial faculty culture. The department will continue to be relatively small compared to its aspirational peers for the foreseeable future. This makes it even more important to encourage the growth of scholarly communities that extend beyond the sub-disciplines.

Response: The Department formed a hiring plan committee and the committee is taking the Review Team's recommendations into consideration in formulating a hiring plan for the next three years.

PHYS 5: Develop a comprehensive strategy for recruiting and retaining a more diverse faculty in the Department of Physics and Astronomy. Possible approaches might include additional search committee training and broader search committee membership, avoiding whenever possible narrowly focused searches, and more vigorous efforts to identify potential applicant pools.

Response: The Department would like to point out that the Review Team mis-counted the number of tenure/tenure-track faculty, there are only 19 not 21; the Review Team probably did not realize that the two instructors (I-2) are not tenure-track. The Department has made tremendous progress in hiring two female faculty members within the past 3 years, considering that there were no female faculty member at all before then. The Department has been proactive in recruiting female faculty in the recent years. Recent faculty job advertisements were posted on the "Women in Physics LinkedIn" website. Before the two female faculty members were hired, the Department recruited female faculty from other departments to serve on the faculty search committee. Now both female physics faculty members serve on the faculty search committee. The Department will continue to find ways to recruit female and minorities (both faculty and students).